

WHAT IS CLAIMED IS:

1. A display apparatus comprising:

a support structure supported on the head of a user, said structure supporting a viewing portion facing one of the eyes of the user and a housing;

said housing supporting therein an image display system comprising

an LED generating light;

a first plastic optical fiber bonded to the LED, said optical fiber receiving light from said LED; and

a reflective display receiving image data and forming an image therefrom, said optical fiber transmitting the light to said reflective display so that the light received from the LED is reflected by the reflective display to project said image; and

optics receiving said projected image from the reflective display and transmitting said image to the viewing portion so as to be viewed by the user.

2. A display apparatus according to claim 1, wherein said support structure is a visor assembly configured to be supported on a helmet worn by the user.

3. A display apparatus according to claim 1, wherein said image display system further comprises a second LED bonded to a second plastic optical fiber receiving light from the second LED, said first and second optical fibers having a combined end portion transmitting the light from the first and second LEDs combined together.

4. A display apparatus according to claim 3, wherein said image display system further comprises a third LED bonded to a third plastic optical fiber receiving light from the third LED, said third optical fiber also being connected with the combined end portion, so that the combined end portion transmits light from the first, second and third LEDs combined together.

5. A display apparatus according to claim 4, wherein the three LEDs each have a respective different color.

6. A display apparatus according to claim 5, wherein said colors are red, green and blue.

7. A display apparatus according to claim 1, wherein said plastic optical fiber comprises a plurality of plastic optical fiber elements each configured to receive light at one end thereof and transmit at least a portion of said light to an opposing end thereof.

8. A display apparatus according to claim 3, wherein said plastic optical fibers each comprise a plurality of plastic optical fiber elements each configured to receive light at one end thereof and transmit at least a portion of said light to an opposing end thereof, and wherein the combined end portion comprises the ends of the optical fiber elements spatially intermixed to combine the light transmitted from the first and second LEDs.

9. A display apparatus according to claim 4, wherein said plastic optical fibers each comprise a plurality of plastic optical fiber elements each configured to receive light at

one end thereof and transmit at least a portion of said light to an opposing end thereof, and wherein the combined end portion comprises the ends of the optical fiber elements spatially intermixed to combine the light transmitted from the LEDs.

10. A display apparatus according to claim 6, wherein said plastic optical fibers each comprise a plurality of plastic optical fiber elements each configured to receive light at one end thereof and transmit at least a portion of said light to an opposing end thereof, and wherein the combined end portion comprises the ends of the optical fiber elements spatially intermixed to combine the red, green and blue light transmitted from the LEDs.

11. A display apparatus according to claim 10, wherein said plastic optical fibers elements are randomly distributed in the combined end portion so as to combine the light from the LEDs transmitted therefrom.

12. A display apparatus according to claim 1, wherein said LED is bonded to the plastic optical fiber by cutting the LED to expose a surface and then bonding an end of the optical fiber to said surface.

13. A display apparatus according to claim 3, wherein said LEDs are each bonded to the associated plastic optical fiber by cutting each LED to expose a respective surface and then bonding an end of the associated optical fiber to said surface.

14. A display apparatus according to claim 4, wherein said LEDs are each bonded to the associated plastic optical fiber by cutting each LED to expose a respective surface and then bonding an end of the associated optical fiber to said surface.

15. A display apparatus according to claim 10, wherein said LEDs are each bonded to the associated plastic optical fiber by cutting each LED to expose a respective surface and then bonding an end of the associated optical fiber to said surface.

16. A display apparatus according to claim 1, wherein a polarizing structure is positioned intermediate the optical fiber and the reflective display, said polarizing structure permitting passage of light therethrough having a first polarity and reflecting light of a polarity that is reverse of said first polarity, the light from the optical fiber striking the polarizing structure in instances before and after the light strikes the reflective display, in one instance said light being reflected by the polarizing structure and in the other instance said polarizing structure permitting passage of light therethrough.

17. A display apparatus according to claim 16, wherein the polarizing structure permits passage of some of the light from the optical fiber therethrough to strike the reflective display, and reflecting said light after it is reflected off the reflective display.

18. A display apparatus according to claim 4, wherein a polarizing structure is positioned intermediate the optical fiber and the reflective display, said polarizing structure permitting passage of light therethrough having a first polarity and reflecting light of a

polarity that is reverse of said first polarity, the light from the optical fiber striking the polarizing structure in instances before and after the light strikes the reflective display, in one instance said light being reflected by the polarizing structure and in the other instance said polarizing structure permitting passage of light therethrough.

19. A display apparatus according to claim 18, wherein the polarizing structure permits passage of some of the light from the optical fiber therethrough to strike the reflective display, and reflecting said light after it is reflected off the reflective display.

20. A display apparatus according to claim 1, wherein the viewing portion is transparent such that the image is visible to the user thereon superimposed on a view therethrough.

21. A display apparatus according to claim 1, and further comprising a diffusion screen between said reflective display and the optics.

22. A display apparatus according to claim 1, wherein the reflective display comprises a reflective surface and a liquid crystal image field overlying said reflective surface.

23. A display apparatus according to claim 1, wherein the reflective display comprises an active-matrix liquid crystal display overlying a reflective surface.

24. A display apparatus according to claim 1, wherein said LED is bonded to the plastic optical fiber by cutting the LED to expose a surface and then bonding an end of the optical fiber to said surface;

said surface being configured in a shape that transmits the light from the LED more efficiently to the optical fibers bonded thereto.

25. A display apparatus according to claim 1, wherein said LED is bonded to the plastic optical fiber by cutting the LED to expose a surface and then bonding an end of the optical fiber to said surface;

said LED being bonded to the plastic optical fiber by an adhesive having a refractive index that is between that of the LED and the plastic optical fiber.

26. A display apparatus according to claim 1, wherein said LED is bonded to the plastic optical fiber by cutting the LED to expose a surface and then bonding an end of the optical fiber to said surface;

said LED being bonded to the plastic optical fiber by an adhesive having a refractive index that is between that of the LED and the plastic optical fiber.

27. A display apparatus according to claim 1, wherein said LED is bonded to the plastic optical fiber by cutting the LED to expose a surface and then bonding an end of the optical fiber to said surface;

said LED being bonded to the plastic optical fiber by an adhesive, the optical fiber being of a material with a refractive index greater than the refractive index of the LED material,

said adhesive having a refractive index that is between that of the LED and the plastic optical fiber.